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TRENDS IN GONORRHEA IN CANADA, 1990-1995

Introduction

Gonococcal infection (ICD9 code 098, excluding 098.4) is a nationally notifiable disease. Five years ago, gonorrhea was the most frequently reported notifiable sexually transmitted disease (STD) in Canada; however, since 1991, genital chlamydial infection has been the most frequently reported STD.

National surveillance data for gonococcal infections consist of three demographic variables: age group, sex, and province of residence. Although some provinces collect more demographic and behavioural data, these data are not available for all provinces.

Gonorrhea is an important public-health issue, especially for females of childbearing age. Approximately 20% to 40% of cases of pelvic inflammatory disease (PID) and 14% of tubal infertility can be attributed to gonococcal infections. As well, approximately 33% of ectopic pregnancies are attributed to prior PID infections[1]. The costs to the Canadian health-care system associated with female gonococcal infections are estimated to be in excess of $43 million annually; 82% of these are for diagnoses and treatment of PID, ectopic pregnancy, and tubal infertility[2]. Because gonococcal infections are preventable and easily treated, prevention and early treatment programs could substantially reduce suffering and economic impacts.

The national rate of reported cases of gonorrhea has declined steadily since 1981. There were 5,500 cases of gonorrhea reported in 1995 compared to 56,330 in 1981; this represents a 10-fold drop in the number of cases reported over the 14-year period. Over the same period, the rate of infection fell 12-fold from 226.2 cases per 100,000 population in 1981 to 18.6 cases per 100,000 in 1995. The rate of infection has decreased 62% from 1990 to 1995, from 49.7 cases per 100,000 in 1990 to 18.6 cases per 100,000 in 1995.

Males and Females > 14 Years of Age

Table 1 lists the number of reported cases and rates of gonococcal infections by gender between 1990 and 1995. Historically, males have had higher rates of infection than females. Approximately 3,032 cases were reported in 1995, an 11-fold decrease over the 34,337 reported in 1981. For females, the number of reported cases dropped almost 10-fold, from 21,863 cases in 1981 to 2,268 in 1995. Although the gender differential has persisted over time, the ratio of male-to-female cases has decreased slightly from 1.57:1.0 in 1981 to 1.34:1.0 in 1995.

In 1995, the rate of infection in males and females was 20.7 cases per 100,000 and 15.2 cases per 100,000, respectively. The gender differential in the rate of infection increased from 23% in 1990 to 27% in 1995. Figure 1 presents gender-specific infection rates for 1990 to 1995.

Figure 1
Incidence of reported gonorrhea, by sex, Canada, 1990-1995

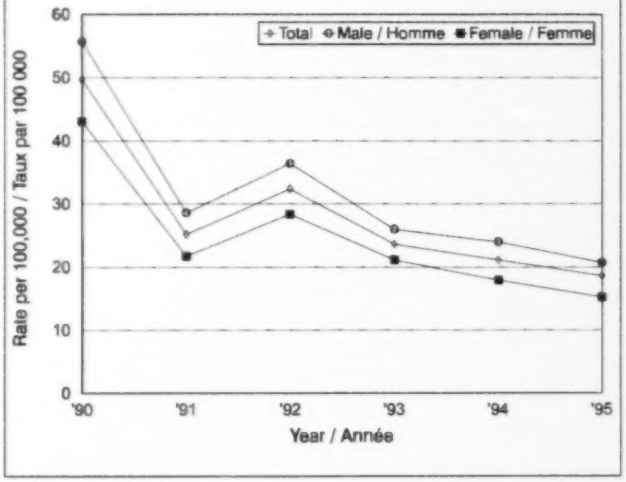

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Table 1
Reported cases and rates* of gonococcal infections in Canada, by age and sex, 1990-1995

Age (years)	1990						1993						1995					
	Male		Female		Total		Male		Female		Total		Male		Female		Total	
	Case	Rate	Case	Rate	Case	Rate	Case	Rate	Case	Rate	Case	Rate	Case	Rate	Case	Rate	Case	Rate
<1	5	2.4	9	4.6	15	3.7	1	0.5	0	0.0	2	0.3	1	0.5	1	0.5	2	0.5
1-4	1	0.1	13	1.7	14	0.9	1	0.1	11	1.4	12	0.7	2	0.2	4	0.5	6	0.4
5-9	3	0.3	9	1.0	12	0.6	3	0.3	3	0.3	7	0.4	0	0.0	2	0.2	2	0.1
10-14	21	2.2	139	15.1	160	8.5	8	0.8	88	9.2	97	4.9	9	0.9	81	8.3	90	64.0
15-19	1,140	115.3	2,168	229.0	3,311	171.1	596	59.9	1,185	124.8	1,783	91.7	411	40.5	856	88.7	1,267	64.0
20-24	2,373	217.9	1,911	180.7	4,291	199.9	1,013	95.6	997	96.8	2,010	96.2	722	69.7	737	73.1	1,459	71.4
25-29	1,791	135.4	918	71.5	2,710	104.0	884	72.9	402	34.0	1,286	53.7	678	59.8	329	29.6	1,009	44.9
30-39	1,553	63.8	564	23.4	2,121	43.8	845	32.4	298	11.6	1,143	22.1	827	31.0	201	7.7	1,167	22.1
40-59	553	17.7	176	5.7	729	11.8	323	9.5	79	2.3	402	5.9	320	8.8	41	1.1	409	5.6
60+	57	3.0	10	0.4	67	1.6	26	1.3	4	0.2	31	0.7	31	1.5	1	0.0	37	0.8
Total	**7,681**		**6,024**		**13,822**		**3,738**		**3,086**		**6,832**		**3,032**		**2,268**		**5,500**	
Rate* (for all ages)		**55.7**		**43.0**		**49.7**		**26.0**		**21.1**		**23.6**		**20.7**		**15.2**		**18.6**

* per 100,000 population

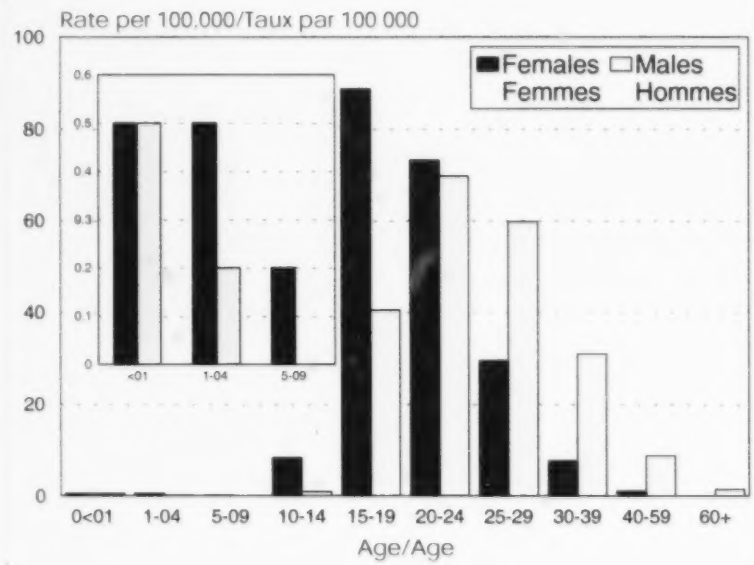
In 1995, females aged 15 to 19 years and 20 to 24 years had the highest rates of infection: or 88.7 cases per 100,000 and 73.1 cases per 100,000, respectively (Figure 2). The third and fourth highest rates were 69.7 cases per 100,000 and 59.8 cases per 100,000 for males aged 20 to 24 years and 25 to 29 years, respectively (Figure 2).

In 1995, 70% of cases reported for females were for those between the ages of 15 and 24 years. The corresponding proportion for males was 37%. For those < 25 years of age, the male-to-female ratio was 1.0:1.9. During the same year, for those ≥ 25 years of age, the corresponding male-to-female ratio was 2.4:1.0.

In 1995, females aged 15 to 19 years had an infection rate of 88.7 cases per 100,000 which is slightly more than twice as high as the rate for males of the same age at 40.5 cases. These 1995 annual rates of infection represent a six-fold and nine-fold decrease over the 1981 rates of 596.1 and 364.6 for females and males, respectively.

From 1990 to 1993, males aged 20 to 24 years had the second highest rate of infection; however, in 1994 and 1995, females aged 20 to 24 years had higher rates of infection than their male counterparts (Figure 3).

Figure 2
Incidence of reported gonorrhea, by age and sex, Canada, 1995



Males ≥ 25 years of age had consistently higher rates of gonococcal infection than females of the same age. Between 1990 and 1995, males aged 25 to 29 years had rates approximately two times higher than that of females in the same age group (Figure 4). During the same time period, males aged 30 to 39 years had a rate of 2.5 cases per 100,000 — four times greater than their female counterparts, with a trend towards an increase in the differences between male and female rates.

For those ≥ 40 years of age, males have consistently had higher rates than females.

Males and Females ≤ 14 Years of Age

Cases of infection in the population < 15 years of age are of concern because of the probability of sexual abuse and exploitation. Females < 15 years of age accounted for 4% of the total female cases reported; 0.4% of the total male cases reported

Figure 3
Incidence of reported gonorrhea, by sex and selected age groups, Canada, 1990-1995

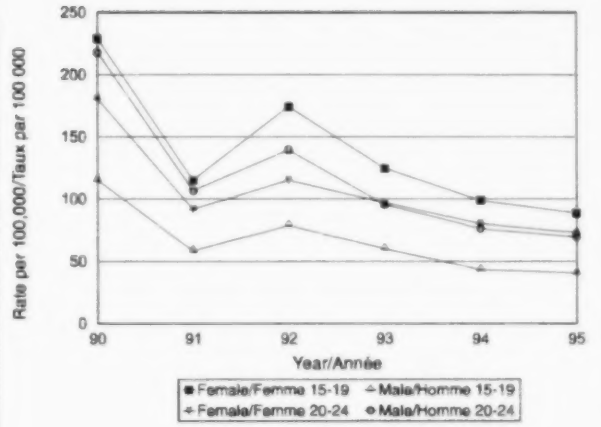


Figure 4
Incidence of reported gonorrhea, by sex and selected age groups, Canada, 1990-1995

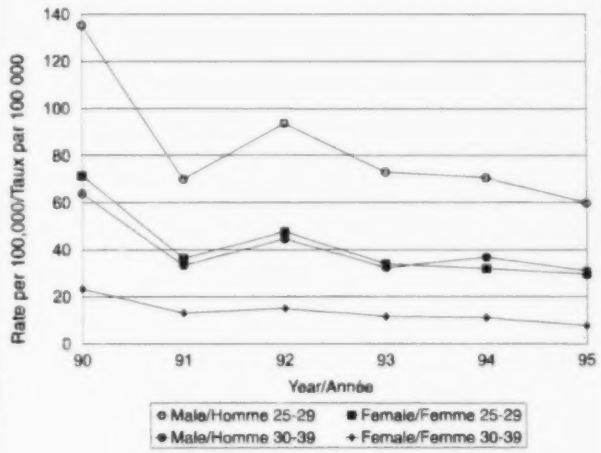
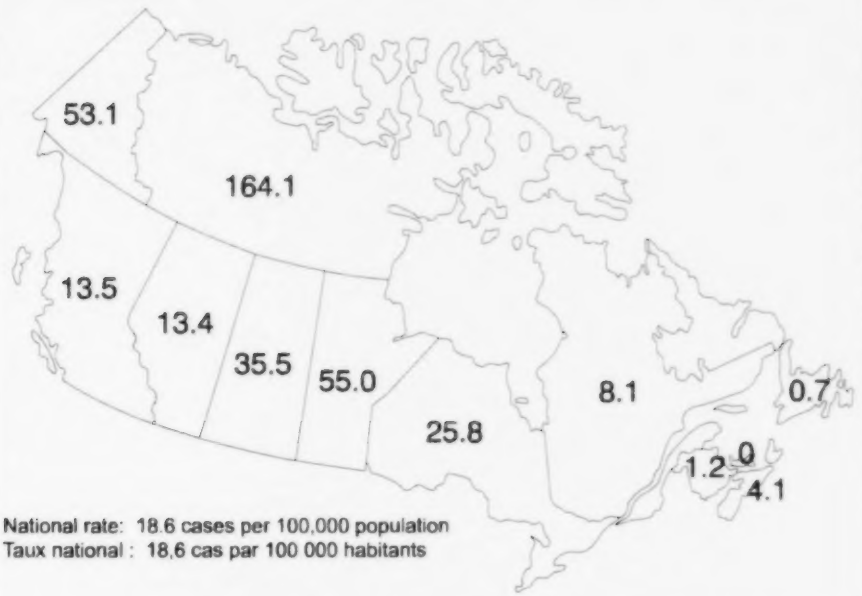


Table 2
Reported cases and rates* of gonococcal infections in Canada, by province, 1990-1995

Province/Territory	1990		1991		1992		1993		1994		1995	
	Case	Taux	Case	Taux	Case	Taux	Case	Taux	Case	Taux	Case	Taux
Newfoundland	49	8.5	25	4.3	13	2.2	3	0.5	3	0.5	4	0.7
Prince Edward Island	10	7.6	6	4.6	3	2.3	—	—	—	—	—	—
Nova Scotia	310	34.0	294	32.0	196	21.2	90	9.7	35	3.7	38	4.1
New Brunswick	62	8.3	53	7.1	24	3.2	8	1.1	13	1.7	9	1.2
Quebec	1,966	28.0	1,380	19.5	891	12.4	680	9.4	735	10.1	595	8.1
Ontario	6,148	59.5	5,381	51.4	3,897	36.6	3,035	28.1	3,123	28.6	2,860	25.8
Manitoba	1,079	97.3	1,295	116.4	1,259	112.7	923	82.1	729	64.5	626	55.0
Saskatchewan	903	89.3	846	84.1	717	71.1	490	48.5	377	37.2	361	35.0
Alberta	1,255	49.1	1,387	53.3	1,174	44.4	831	30.9	506	18.6	373	13.6
British Columbia	1,500	45.5	1,330	39.4	792	22.8	566	15.8	490	13.4	510	13.5
Yukon	85	303.3	77	264.2	13	42.9	23	75.6	13	43.8	16	53.1
Northwest Territories	455	766.6	383	624.8	274	438.0	183	287.4	143	221.0	108	164.1
Total	**13,822**		**12,457**		**9,253**		**6,832**		**6,167**		**5,500**	
Rate (for all ages)		**49.7**		**44.3**		**32.4**		**23.6**		**21.1**		**18.6**

Figure 5
Incidence of reported gonorrhea, by province and territory, Canada, 1995



were < 15 years of age (inset, Figure 2). The male-to-female ratio was 1.0:7.3. In 1995, the rate of infection for females aged 10 to 14 years was 8.3 cases per 100,000 compared with 0.9 cases per 100,000 in males of the same age. In 1981, the corresponding rates of infection were 23.2 and 5.4 cases per 100,000, respectively. These data should be interpreted with caution: the decrease in the number of cases of gonorrhea in this population likely mirrors the decrease in the number of cases in the adult population. This should not be interpreted as an indicator of a decrease in the number of cases of sexual abuse and exploitation.

Geographic Distribution

Traditionally, the Maritime provinces have had the lowest reported rates of gonococcal infections and the Northwest Territories have had the highest (Figure 5).

Table 2 lists the number of reported cases and rates by province between 1990 and 1995. A general downward trend in both the number of cases reported and rates has been observed in all provinces and territories. Occasional increases in cases or rates are mostly likely due to random variation or instability associated with the small numbers of cases reported.

Interprovincial comparisons must be interpreted with caution. Various factors may contribute to provincial differences, such as the introduction of screening and educational programs, migration of high-risk and core groups, use of single versus multidose antibiotic therapy, and effectiveness of contact-tracing programs.

Antimicrobial Resistance

In Canada, antimicrobial-resistant strains of penicillinase- producing *Neisseria gonorrhoeae* (PPNG) and tetracycline- resistant *N. gonorrhoeae* represented 11% of the total reported cases of gonorrhea in 1990. By 1995, the proportion had risen to 23%. As well, reports of decreased susceptibility or resistance to the fluoroquinolones (notably, ciprofloxicin and norfloxicin) in Canada have recently been published. Most of these have been linked to imported cases[4-7].

The recommended first-line treatments for gonorrhea (third generation cephalosporins and the fluroquinolones) are effective against PPNG and tetracycline-resistant *N. gonorrhoeae*.

Core Groups

Core groups are a small subset of the population whose members frequently acquire new sexual partners[8,9]. Presently, the majority of endemic gonococcal infections is thought to reside within core groups[8-10]. More research needs to be conducted to assess and describe core groups within a Canadian context; appropriate prevention and control strategies, aimed at reducing or ideally eliminating indigenous gonococcal infections, can then be implemented.

Discussion

The dramatic decline in the incidence of gonorrhea since 1981 can likely be attributed to changes in sexual behaviour brought about by primary prevention strategies in response to the advent of HIV/AIDS, as wells as by improved case management, contact tracing, and treatment.

The decline in incidence is expected to continue in the coming years. Improvements in treatment, specifically single-dose antibiotic therapies introduced in 1992, should eliminate any compliance problems. As well, recent advances in non-invasive diagnostic technologies, such as the polymerase and ligase chain reactions, should make testing more client-friendly. If those at risk can be tested and treated sooner, the duration of infectivity will be decreased. This in turn will decrease the likelihood of infecting others and, therefore, decrease the incidence rate of gonorrhea in the population. As the number of gonococcal infections decreases, strong contact-tracing programs become an important control strategy in identifying and treating infected individuals. Outreach strategies must be developed and implemented to access 'hard-to-reach' marginalized populations, such as street youth and injection drug users, where cases of antimicrobial resistance are likely to persist, and where sexual activity is a source of income. Adolescents and young adults, especially females, should be

targeted for primary prevention strategies. With these prevention and control strategies in place, the elimination of endemic gonorrhea within Canada may be achievable within the next decade.

The Division of STD Prevention and Control, Laboratory Centre for Disease Control, in partnership with the provincial and territorial STD control programs, will continue to closely monitor future trends.

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Source: *S Squires, BScN, MSc, J Doherty, MSc, Division of STD Prevention and Control, Bureau of HIV/AIDS and STD, LCDC, Ottawa, ON.*

International Notes

DENGUE AND DENGUE HEMORRHAGIC FEVER IN THE AMERICAS, 1996

In 1996, a total of 250,707 cases of dengue (DF) including 4,440 cases of dengue hemorrhagic fever (DHF) were reported to the WHO Regional Office for the Americas/Pan American Health Organization. Outbreaks of DF were reported in Brazil, Mexico and Trinidad and Tobago. DHF continued to occur in Colombia and Venezuela and, for the second consecutive year, Mexico reported hundreds of DHF cases.

All four dengue serotypes continued to circulate. Dengue-3, which was reintroduced in the Americas in the second half of 1994, initially in Nicaragua and Panama and subsequently spread to other countries in Cenral America and Mexico, was not reported in any new country in the Americas in 1996.

MENINGITIS IN THE WHO AFRICAN REGION Update, January-April 1997

In Togo, the epidemic of cerebrospinal meningitis is completely over. The weekly number of reported cases in Burkina Faso, the Gambia, Ghana and Mali has steadily decreased since the thirteenth week of 1997, and it is hoped that with the immunization activities being carried out and the recent rain in most affected areas, the epidemic may soon be under control. Table 1 shows the cumulative number of cases/deaths notified from 1 January to 28 April 1997.

Table 1
Cumulative cases/deaths due to meningitis in the WHO African Region as of 28 April 1997

Country	Cases	Deaths	Case-fatality rate
Algeria (26.04)	6	1	16.7
Benin (23.03)	273	47	17.2
Burkina Faso (19.04)	20,270	2,274	11.2
Central African Republic (28.02)	10	3	30.0
Chad (30.03)	158	25	15.8
Eritrea (14.04)	5	0	0.0
Gambia (09.04)	913	120	13.1
Ghana (05.04)	14,862	1,270	8.5
Mali (11.04)	6,296	619	9.8
Mauritania (31.03)	11	2	18.2
Niger (31.03)	2,159	251	11.6
Rwanda (09.03)	10	4	40.0
Senegal (09.04)	13	4	30.8
Togo (16.04)	2,781	385	13.8
Total	**47,767**	**5,005**	**10.5**

() = Last reporting date

Source: *WHO Weekly Epidemiological Record, Vol 72 Nos 17 and 18, 1997.*